SOIL CONSERVATION SERVICE

KENTUCKY INTERIM

GUIDE STANDARD

LAND RECLAMATION, HIGHWALLS 456-1

Definition

Reducing harmful effects of highwalls in abandoned mined areas.

Scope

This standard applies to the treatment of highwalls resulting from past mining activities and is usually associated with reclamation and reconstruction of abandoned coal mine areas.

Purpose

To reduce highwalls height or slopes to satisfactory levels or eliminate the hazard to human health and safety, to control erosion and sediment, to improve visual quality, to create conditions conducive to the establishment of protective cover, and return the area to a beneficial land use.

Conditions where practice applies

To areas where highwalls resulting from past mining are (1) a hazard to human health and safety; (2) unstable and contributing excessive sediment to adjacent land and waters; (3) degrading water quality, the environment, or landscape resources. The principles stated in this standard are also applicable to the treatment of highwalls not associated with mining.

Planning considerations

1. Geology and the associated subsurface conditions of the highwall area.
2. Surface and subsurface hydrologic conditions.
3. Land use, land ownership, dwellings, and other improvements in the adjacent area.
4. Slide or failure potential.
5. Contribution of sediment to offsite areas.
6. Availability of backfill material.
7. Landscape (visual) resources.
8. The extent and quality of associated wetland areas.
9. Water quality.
10. Surface water disposal.

The existence of a highwall does not necessarily mean that treatment is required. There are three basic types of problems that should be considered for treatment: (1) The highwall is in proximity to roads, schools, parks, dwellings, or other populated areas and presents a substantial hazard to human

health and safety. The potential for occasional exposure by humans to the unsafe condition does not qualify as a substantial hazard; (2) the site is unstable with actual or potential failure, is contributing excessive sediment to adjacent land or waters, or is otherwise degrading the environment; (3) the highwall is determined to be a significant visual degrader. It may have positive, negative, or even neutral effects on visual quality. Its existence may add a desirable element of variety to the landscape or may otherwise fit into a planned and pleasing landscape. Its location may also be so remote or obscure that it does not present a visual problem. The number of people viewing the highwall is an important consideration in making the determination.

Full consideration should be given to fencing and vegetative barriers as an alternative solution if safety to humans is the problem. Recognize that barriers do not solve the problem; they just reduce the likelihood of human injury. Major earthwork to reduce or eliminate the highwall will usually be required to remedy stability problems. Screening may be effective in solving visual problems.

Elimination of water areas or wetlands in association with highwall reduction may present adverse environmental effects. The quality of the water for fish, wildlife, and vegetative growth is a key factor in determining wetland classification. All wetlands and water areas must be properly classified and protected, or losses mitigated in accordance with SCS policies (see SCS policy, 7 CFR 650). Acid or other toxic aqueous discharges should be treated according to the standard for toxic discharge control (455).

Design considerations and criteria

Landscape (visual) resources. The appearance of the reclaimed site must be in accordance with standards of maintaining and improving the visual quality of the landscape and must be comparable with adjacent undisturbed areas. Areas of high public visibility or those offering direct or indirect human benefits shall be evaluated and considered in a landscape resource management plan and design. Borrow areas are to be reshaped and vegetated as a part of the landscape plan and design.

Barriers to human access

Fencing and vegetative barriers may be used singularly or in combination. Fencing shall be "anti-intruder" chain link, barbed wire, or net wire and barbed wire combination. Fencing such as black vinyl coated wire should be considered if reduced visibility is desired.

Vegetative barriers shall consist of vigorous, durable plant species adapted to the site, with growth habits that will provide a positive barrier to human access. Barriers are to be planned and designed as a part of the landscape management plan.

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Reduction (height or slope). Consideration should be given to a combination of cut and fill or to partial reduction for meeting objectives with least cost.

Slope stability. Highwalls in rock formations may be stable on steep slopes. In these cases, treatment needs may be limited to controlling rolling or falling rocks for which fences or dikes at the base of the slope may be used as control measures.

Highwall in earth, fractured rock, or other weak materials are to be evaluated to determine if an analysis of the failure potential is needed. Measures developed to prevent or stabilize failures associated with highwalls shall be based on engineering judgment and analyses made by an engineer trained and experienced in soil mechanics.

Slope stability analyses shall account for all critical soil and loading conditions. The strength parameters of natural soil and rock or of waste materials shall be based on the appropriate conditions for each site. Long-term strengh parameters (c = o and internal friction based on residual shear) are often required. The methods of slope stability analysis are to be appropriate for the loading conditions and the location and shape of the potential failure surfaces. Appropriate factors of safety shall be provided based on the degree of uncertainty in the soil strength values used, the soil and water conditions assumed, and the details of the analysis used.

When there is a potential for loss of life or damage to farmsteads, residential areas, frequently traveled roads, or other occupied facilities, the measures shall include removal of the highwall or other positive control that insures safety.

Earthquake or seismic forces are to be considered in the appropriate locations. The criteria for geologic investigations, seismic assessments, and minimum seismic coefficients associated with earthquakes as contained in Technical Release No. 60 for earth dams shall apply.

Water disposal. The need for drainage, erosion control, and water disposal systems shall be carefully analyzed and needed systems included in the design. Acid water discharges must be treated as necessary to meet the environmental requirements of the receiving waters as prescribed by the regulatory agency.

Other practices. All individual practice components shall be designed and installed in accordance with appropriate SCS standards and specifications. Where standards do not exist, applicable current technology shall be used.

Maintenance

Maintenance activities are to be outlined in a maintenance plan. Water management systems, erosion control systems, vegetative cover, and barriers are to be

maintained to accomplish their intended purposes. Regular periodic inspections must be carried out and needed repairs made promptly.

Plans and specifications

Plans and specifications for highwall treatment shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve the intended purpose.

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